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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	09/742,421
		Filing Date	December 22, 2000
		First Named Inventor	Sofiene Affes
		Group Art Unit	2661
		Examiner Name	
Sheet 1 of 5	Attorney Docket Number	AP680761US	

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Number	Kind Code ² (if known)		
	1A	6,097,771		Foschini	08-01-2000
	1B	6,067,200		Paulraj et al.	05-28-2000
	1C	5,341,395		Bi	08-23-1994
	1D	5,761,237		Petersen et al.	06-02-1998
	1E	5,872,776		Yang	02-16-1999
	1F	5,363,403		Schilling et al.	11-08-1994
	1G	5,467,388		Takeuchi et al.	11-14-1995
	1H	5,553,062		Schilling et al.	09-03-1996
	1I	5,563,610		Reudink	10-08-1996
	1J	5,621,752		Antonio et al.	04-15-1997
	1K	5,648,968		Reudink	07-15-1997
	1L	5,719,862		Schilling et al.	02-17-1998
	1M	5,734,647		Yoshida et al.	03-31-1998
	1N	5,799,004		Kaskitalo et al.	08-25-1998
	1O	5,859,879		Belgiano et al.	01-12-1999
	1P	5,862,124		Hoffinen et al.	01-19-1999
	1Q	5,897,034		Suzuki	03-23-1999

FOREIGN PATENT DOCUMENTS							
Examiner Initials	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Office ³	Number ⁴	Kind Code ⁵ (if known)			
	1R	EP	0 951 091 A2		Lucent Technologies	10-20-1999	
	1S	EP	0 491 668 A2		Ericsson - GE Mobile	06-24-1992	
	1T	EP	0 641,102 A2		Philips Electronics UK Limited	03-01-1995	
	1U	WO	97/02666		Nokia Telecommunications OY	01-23-1997	
	1V	WO	99/01946		Nokia Telecommunications OY	01-14-1999	
	1W	CA	2,202,115		Liang Hsu et al.	01-18-1998	
	1X	EP	0 526 439 A1		Ericsson - GE Mobile	02-03-1993	
	1Y	EP	0 615 355 A2		NTT Mobile Communications	09-14-1994	
	1Z	WO	92/10890		Qualcomm Incorporated	06-25-1992	

Examiner Signature	<i>S. Boonre</i>	Date Considered	11/9/04
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		Filing Date	December 22, 2000
		First Named Inventor	Sofiene Affes
		Group Art Unit	2661
		Examiner Name	
Sheet 2	of 5	Attorney Docket Number	AP660761US

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate); title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
J	2A	"Wideband DS-CDMA for next generation mobile communications systems", by F. Adachi, M. Sawahashi and H. Suda in IEEE communications Magazine, vol. 36, No. 9, pp. 55-69, September 1998.	
J	2B	"Multiuser detection for CDMA systems", by A. Duel-Hallen, J. Holtzman, and Z. Zvonar in IEEE Personal Communications, pp. 46-58, April 1995.	
J	2C	"Multi-user detection for DS-CDMA communications", by S. Moshavi in IEEE Communications Magazine, pp. 124-136, October 1996.	
J	2D	"Minimum probability of error for asynchronous Gaussian multiple-access channels", by S. Verdu in IEEE Trans. on Information Theory, vol. 32, no. 1, pp. 85-96, January 1986.	
J	2E	"Optimum detection of code division multiplexed signals", by K.S. Schneider in IEEE Trans. on Aerospace and Electronic Systems, vol. 15, pp. 181-185, January 1979.	
J	2F	"Cancellation techniques of co-channel interference in asynchronous spread spectrum multiple access systems", by R. Kohno, M. Hatori, and H. Imai in Electronics and Communications in Japan, vol. 66-A, no. 5, pp. 20-29, 1983.	
J	2G	"A family of suboptimum detectors for coherent multi-user communications", by Z. Xie, R.T. Short, and C.K. Rushforth in IEEE Journal on Selected Areas in Communications, vol. 8, no. 4, pp. 683-690, May 1990.	
J	2H	"Very low rate convolutional codes for maximum theoretical performance of spread-spectrum multiple-access channels", by A.J. Viterbi in IEEE Journal of Selected Areas in Communications, vol. 8, no. 4, pp. 641-649, May 1990.	
J	2I	"Multistage detection in asynchronous code-division multiple-access communications", by M.K. Varanasi and B. Aazhang in IEEE Trans. on Communications, vol. 38, no. 4, pp. 509-519, April 1990.	
J	2J	"Combination of an adaptive array antenna and a canceller of interference for direct-sequence spread-spectrum multiple-access system", by R. Kohno et al. in IEEE Journal on Selected Areas in Communications, vol. 8, no. 4, pp. 675-682, May 1990.	
J	2K	"Decorrelating decision-feedback multi-user detector for synchronous code-division multiple-access channel", by A. Duel-Hallen in IEEE Trans. on Communications, vol. 41, no. 2, pp. 285-290, February 1993.	

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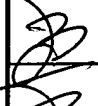
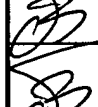


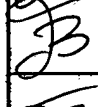


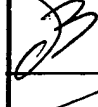


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		Filing Date	December 22, 2000		
		First Named Inventor	Sofiène Affes		
		Group Art Unit	2661		
		Examiner Name			
Sheet	3	of	5	Attorney Docket Number	AP660761US

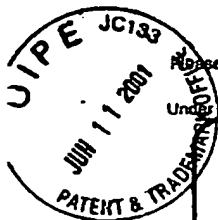
OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
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	3A	"Zero forcing and minimum mean-square-error equalization for multi-user detection in code-division multiple-access channels", by A. Klein, G.K. Kaleh, and P.W. Baier in IEEE Trans. on Vehicular Technology, vol. 45, no. 2, pp. 276-287, May 1996.	
	3B	"A new receiver structure for asynchronous CDMA : STAR - the spatio-temporal array-receiver", by S. Affes and P. Mermelstein in IEEE Transactions on Selected Areas in Communications, vol. 16, no. 8, pp. 1411-1422, October 1998.	
	3C	"An algorithm for multisource beamforming and multitarget tracking", by S. Affes, S. Gazor, and Y. Grenier in IEEE Trans. on Signal Processing, vol. 44, no. 6, pp. 1512-1522, June 1996.	
	3D	"Analysis of a simple successive interference cancellation scheme in a DS/CDMA system", by P. Patel and J. Holtzman in IEEE Journal on Selected Areas in Communications, vol. 12, no. 5, pp. 796-807, June 1994.	
	3E	"Partial decorrelating detection for DS-CDMA systems", by J. Choi in Proceedings of IEEE PIMRC '99, Osaka, Japan, vol. 1, pp. 60-64, September 12-15, 1999.	
	3F	"Signal Processing Improvements for Smart Antenna Signals in IS-95 CDMA", by S. Affes and P. Mermelstein in Proceedings of IEEE PIMRC '98, Boston, U.S.A., Vol. II, pp. 967-972, September 8-11, 1998.	
	3G	"Performance of a CDMA beamforming array-receiver in spatially-correlated Rayleigh-fading multipath", by S. Affes and P. Mermelstein in Proc. of IEEE VTC'99, Houston, USA, May 16-20, 1999.	
	3H	"A beamformer for CDMA with enhanced near-far resistance", by H. Hansen, S. Affes and P. Mermelstein in Proc. of IEEE ICC'99, Vancouver, Canada, Vol. 3, pp. 1583-1587, June 6-10, 1999.	
	3I	"Impact of synchronization on receiver performance in wideband CDMA networks", by K. Cheikhrouhou, S. Affes, and P. Mermelstein in Proc. of 34th Asilomar Conference on Signals, and Computers, Pacific Grove, USA, to appear, October 29-November 1, 2000.	
	3J	"A High Capacity CDMA Array-Receiver Requiring Reduced Pilot Power", by S. Affes, A. Louzi, N. Kandil, and P. Mermelstein in Proc. IEEE GLOBECOM'2000, San Francisco, USA, vol. 2, pp. 910-916, November 27-December 1, 2000.	
	3K	"Interference subspace rejection in wideband CDMA - part I: Modes for mixed power operation", by S. Affes, H. Hansen, and P. Mermelstein, submitted to JSAC, October 2000.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 4 of 5

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Application Number	09/742,421
Filing Date	December 22, 2000
First Named Inventor	Sofiene Affes
Group Art Unit	2661
Examiner Name	
Attorney Docket Number	AP660761US

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<i>[Signature]</i>	4A	"Interference subspace rejection in wideband CDMA - part II: Modes for high data-rate operation", submitted by H. Hansen, S. Affes, and P. Mermelstein to JSAC, October 2000.
<i>[Signature]</i>	4B	"Spreading codes for direct sequence CDMA and wideband CDMA cellular networks", by E.H. Dinan and B. Jabbar in IEEE Communications Magazine, vol. 36, no. 9, pp. 48-54, September 1998.
<i>[Signature]</i>	4C	"Near-far resistance of multiuser detectors in asynchronous channels", by R. Lupas and S. Verdu in IEEE Trans. on Communications, vol. 38, no. 4, pp. 496-508, April 1990.
<i>[Signature]</i>	4D	"A family of multiuser decision-feedback detectors for asynchronous code-division multiple access channels", by A. Duel-Hallen in IEEE Trans. on Communications, vol. 43, no. 5, pp. 796-807, June 1994.
<i>[Signature]</i>	4E	"Coded asynchronous CDMA and its efficient detection", by C. Schlegel, P. Alexander, and S. Roy in IEEE Trans. on Information Theory, vol. 44, no. 7, pp. 2837-2847, November 1998.
<i>[Signature]</i>	4F	"A matrix-algebraic approach to successive interference cancellation in CDMA", by L.K. Rasmussen, P. J. Lim, and A. E. Johansson in IEEE Trans. on Communications, vol. 48, no. 1, pp. 145-151, January 2000.
<i>[Signature]</i>	4G	"LMMSE detection for DS-SS-CDMA systems in fading channels", by M. Latva-aho and M.J. Juntti in IEEE Trans. on Communications, vol. 48, no. 2, pp. 194-199, February 2000.
<i>[Signature]</i>	4H	"Spatio-Temporal Array-Receiver for Multipath Tracking in Cellular CDMA", by S. Affes and P. Mermelstein in 1997 IEEE International Conference on Communications, vol. 3, June 8-12, 1997, Montreal, Canada, pp. 1340-1345.
<i>[Signature]</i>	4I	"Interference Subspace Rejection in Wideband CDMA: Modes for Mixed-Power Operation", by S. Affes, H. Hansen, and P. Mermelstein in Proc. of IEEE ICC'01, Helsinki, Finland, to appear, June 11-15, 2001.
<i>[Signature]</i>	4J	"Pilot-Assisted STAR for Increased Capacity and Coverage on the Downlink of Wideband-CDMA Networks", by S. Affes, A. Saadi, and P. Mermelstein in Proc. of IEEE Signal Processing Workshop on Signal Processing Advances in Wireless Communications SPAWC'01, Taoyuan, Taiwan, to appear, March 20-23, 2001.
<i>[Signature]</i>	4K	"Near-Far Resistant Single-User Channel Identification by Interference Subspace Rejection in Wideband CDMA", by S. Affes, H. Hansen, and P. Mermelstein in Proc. of IEEE Signal Processing Workshop on Signal Processing Advances in Wireless Communications SPAWC'01, Taoyuan, Taiwan, pp. 54-57, March 20-23, 2001.

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				First Named Inventor	Sofène Affes
				Group Art Unit	2661
				Examiner Name	
				Attorney Docket Number	AP660761US
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				Group Art Unit	2661
				Examiner Name	
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